Table of Contents

F01 Displays, Indicators and Controls

BLANK PAGE

Displays, Indicators and Controls

Model: F01/F02

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Explain the various stages of operation of the instrument cluster

- Explain the operation of the new controller and steering wheel controls

- Navigate through the CID menus

- Access an instrument cluster self test

- Access the service menu on the CID

Introduction

As in all other BMW models, the operating and control concept of the new BMW 7 Series F01/F02 is based on clear and optimum structuring of the cockpit. Fewer switches simplify logical operation. The display, indicator and control elements are organized in a hierarchical arrangement corresponding to their function.

This product information covers exclusively the following topics:

- Instrument cluster and
- Central Information Display, CID.

Note: All other display systems such as "Head-Up Display", "Night Vision 2", "Connected Service" and "Personal Profile" are described in detail in separate sections of this course's reference material.

Display, Operating and Control Concept

With the new BMW 7 Series F01/F02, a new operating and control concept is being introduced at BMW. In addition to the main menu, there is an arrangement of four direct access buttons, a Back button and an Option button in the immediate vicinity of the controller.

Display, operating and control concept BMW 7 Series F01/F02

Index	Explanation
1	Head-up display (HUD)
2	Instrument cluster
3	Central Information Display (CID)
4	Favorite buttons for individual assignment
5	Controller
6	Gear selector switch (GWS)
7	Steering column stalk/steering wheel
8	Operating unit for driver assistance systems (BEFAS)

Instrument Cluster

The instrument cluster is a new development. It has four analog needle instruments based on full-surface Black Panel technology.

With this display technology, the symbols of the individual functions only become visible when the ignition is switched on.

At first glance, the instrument cluster appears as a black surface, without an arrangement of digits and different-colored function symbols.

The two large dials show the road speed and engine speed.

The two small dials indicate the fuel level on the left-hand side and the oil temperature on the right-hand side.

Most of the indicator lamps arranged are in the center, at the top between the two large dials and above the two small dials.

A permanent background image in orange gives the instrument cluster a certain 3D representation.

The TFT display is located in the lower part of the instrument cluster, in the center between the two small dials.

The display for the Entertainment mode is located on the right-hand side of the display; the Navigation display is in the center; and the display for Check Control messages is on the left.

BMW 7 Series instrument cluster

Central Information Display (CID)

The Central Information Display, CID, is a further development of the CID already used in BMW models.

The new BMW 7 Series F01/F02 features very similar software as used in the CID installed in the BMW 3 Series with a CIC.

As on all new BMW models, the system is operated by means of the central control element, the controller.

The is an operating unit for the following functions:

- CD/Multimedia
- Radio
- Telephone
- Navigation
- Contacts
- BMW Assist
- Vehicle Info (Owner's Manual)
- Settings

Personal Profile

The "Personal Profile" systems allows the driver to set several functions in the BMW 7 Series F01/F02 to suit his/her personal requirements.

Personal Profile stores the data entered by the driver such as automatic setting of the outside mirrors or speed-dependent volume in the corresponding control units.

As soon as the vehicle is unlocked using the identification transmitter, the system recognizes the corresponding settings belonging to the identification transmitter.

Up to three different basic settings can be adapted for three different persons. The precondition is that each of the three persons has his/her own identification transmitter.

Controls on the Steering Wheel

There are blocks of buttons in the steering wheel on the left and right.

The controls for the cruise control function are located on the left-hand side of the steering wheel.

The controls for operation of the radio and telephone functions are on the right.

Controls on the steering wheel

Index	Explanation
1	Set button, Save speed
2	Reduce distance button
3	Toggle switch + - Change speed
4	Increase distance button
5	Enable / disable, interrupt DCC/ACC
6	Resume / call-up stored speed button
7	Knurled wheel Select radio station
8	MODE button Switch audio sources
9	Toggle switch + Change volume
10	Toggle switch - Change volume
11	Hands-free button
12	Telephone button

Controller

The operating and control concept of the controller on the F01/F02 has been extended to include a number of toggle switches that can be a great advantage for menu guidance.

In addition to a possibility to open the main menu in the CID, an arrangement of toggle switches for the most important menu items in the main menu is located in the immediate vicinity of the controller.

Center console on BMW 7 Series F01/F02

Index	Explanation	Index	Explanation
1	CD toggle switch	8	Back toggle switch
2	Main Menu toggle switch	9	Parking brake, automatic
3	Telephone toggle switch	10	PDC button
4	Navigation toggle switch	11	Side View button
5	Controller	12	Parking brake, electrical
6	Radio toggle switch	13	Driving dynamics switch, DSC button
7	Option toggle switch	14	Gear selector lever

System Overview

The system circuit diagram for the outside temperature is displayed below.

The diagram is structured in such a way that only the control units and control elements directly involved in the instrument cluster are shown.

The instrument cluster receives a large number of different bus signals that provide information (speed, CC messages, etc.) for the various displays and indicators. These bus signals are requests to the instrument cluster and are therefore not listed in this product information.

The only directly connected component that can be seen in the system circuit diagram is the outdoor temperature sensor.

This input signal is read directly in the instrument cluster and made available from here to all other bus users. The outdoor temperature sensor wiring "passes through" the junction box and is processed directly by the instrument cluster.

System circuit diagram for outside temperature
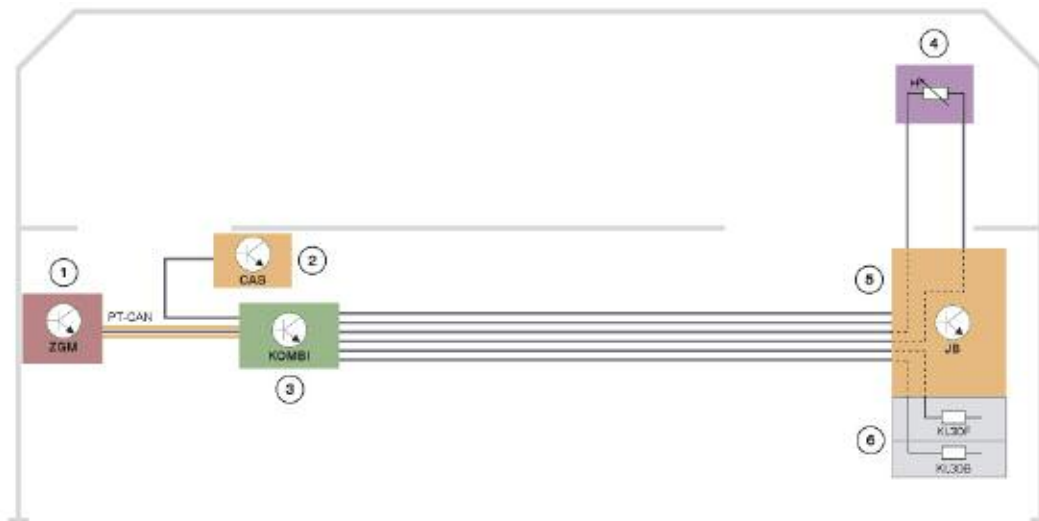
Index	Explanation	Index	Explanation
1	Central Gateway Module (ZGM)	4	Outside Temperature Sensor
2	Car Access System (CAS)	5	Junction Box
3	Instrument Cluster	6	Front Distribution Box

Principles of Operation

Instrument Cluster

The instrument cluster receives information on the wiring harness in the form of analog and digital electrical signals. These signals are processed and displayed in the instrument cluster or passed on as information to other control units.

On the new BMW 7 Series F01/F02, the instrument cluster has a number of functions that are new to BMW or have changed in relation to existing BMW models.

Black Panel Technology
The F01/F02 is the first BMW vehicle to utilize Black Panel technology. This is a panel, the back of which is coated with black film that virtually covers the entire surface portion of the instrument cluster.

Black Panel technology is used on the instrument cluster, control panels for IHKA/AUDIO and FKA.

On the instrument cluster, the area that is not covered by the Black Panel is designed in such a way that the symbols of the lamps are not visible when switched off.

The Black Panel surface appears homogeneously dark, which means that no details from the background area can be detected.

The two large accentuating rings for the speedometer and tachometer and two small dial areas for the fuel gauge and oil temperature are galvanized.

Instrument Cluster – Off
When the instrument cluster is switched off, the analog indicators are at their zero point, the active area of the display is switched off and the rings in the display area are not closed.

Instrument Cluster – Vehicle Awake
When the vehicle is awake, the analog indicators are at their zero point, the active area of the display is switched on only to complete the lower portion of the rings in the display area.

Note: The control panels for the integrated automatic air-conditioning system (IHKA), AUDIO and rear automatic heater / air conditioner (FKA) are also designed in this new technology.

TFT Display

A horizontal TFT display with a resolution of 960 x 160 pixels is integrated in the instrument cluster underneath the dials.

The large mechanical, analog dials are open at the bottom. These dials are closed by graphics. The graphics are displayed digitally and contain specific functional indicators such as the range or current consumption.

The display enables the prioritization of information with the following representations:

- under right dial - display of audio and telephone lists that can be operated via the multifunction display, MFL
- under left dial - display of longer, two-line Check Control texts
- center display area - the navigation information, including other navigation texts under the left-hand and right-hand dial.

This structure of the instrument cluster enables flexible use of the display area and keeps the signature BMW appearance for the large dials for road speed and engine speed.

The most important information that appears depending on the content and prioritization is:

- Navigation display
- Infotainment (audio and telephone)
- Voice input acknowledgement
- Check Control messages
- Traffic information
- Acknowledgements of assistance systems.

The background image is activated in orange and is always displayed as soon as anything appears in the display.

◾ Schematic Breakdown of the Display Area

The graphic in the page below shows the schematic breakdown of the display area in the instrument cluster. Nighttime design is activated in the display when the parking lights or headlights are on.

■ Daytime-nighttime Design

The daytime-nighttime design differs with regard to the color assignment of some text and graphic elements.

Nighttime design   **Daytime design**

The following displays change from white to orange:

- Scales and scale lettering of the large and small dials

- Basic indicators, e.g. time, outside temperature

- Gear indicators

- On-board computer and navigation displays

- CC texts and texts for operation acknowledgements

- Text and line for rear seat belt status

Under the following conditions, nighttime design is activated in the display:

- Side lights ON

- Low-beam headlights ON, in darkness or in a tunnel.

Note: **The texts in the CBS reset menu and the test functions are always in white, independently of the daytime / nighttime view.**

Schematic Breakdown of the Display Area

The following graphic shows the schematic breakdown of the display area in the instrument cluster.

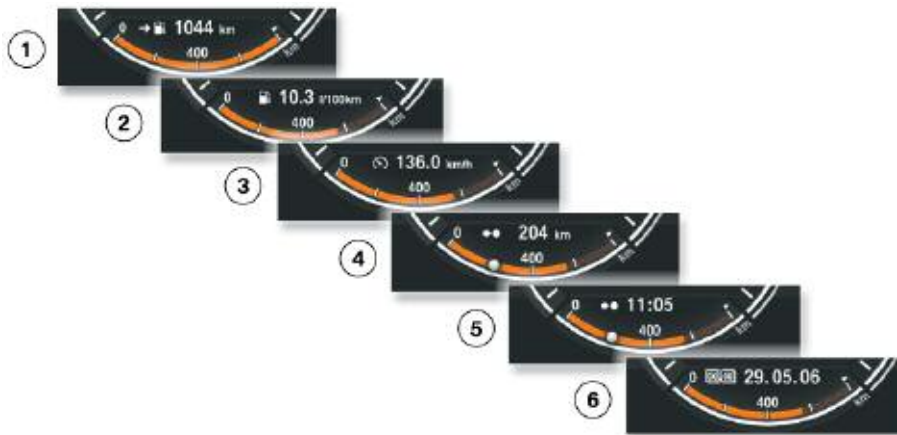| Index	Explanation	Index	Explanation
1	Two-color flush-mounted pointer	6	Navigation (junction view) Lane Guiding Condition Based Service Test menu
2	FAS status indicator FAS information FAS warnings	7	Check Control messages Operation acknowledgements Traffic information Navigation (Distance to Junction)
3	Rear seat belt status Entertainment (symbols) Communication (symbols) PTT acknowledgement (symbols)	8	Range (analog and digital) On-board computer Operation acknowledgements (symbols) Speed Limit Info
4	Fuel consumption indicator (analog) Gearbox position Manual gear indicator Shift recommendation Display FDS menu Automatic engine start-stop function	9	Check Control (symbol) Traffic information (symbols)
5	Entertainment lists FDS menu Navigation "Coming Road"	10	Reset button Trip distance recorder

On-board Computer

On-board computer function in the instrument cluster.

The on-board computer functions can be called up by briefly pressing the on-board computer button on the steering column stalk.

Pressing the on-board computer button again displays information in the following order:

- Range

- Average fuel consumption

- Average speed

- Distance (Nav destination entered)

- Estimated time of arrival (Nav destination entered)

- Date

Steering column stalk

Index	Explanation
1	On-board Computer Button
2	High Beam Assistance Button
3	Left Stalk switch

Index	Explanation
1	Range: If the value displayed for the range is greater than the highest value on the scale, the analog indicator is on the right-hand edge of the scale. The digital indicator shows the current value.
2	Average fuel consumption: The display is a maximum of 2 digits plus one decimal place in US mpg.
3	Average speed: The display is a maximum of 3 digits plus one decimal place in US mph.
4	Distance (Nav destination entered): In addition to the 4-digit display of the digital distance value, the distance to the destination is shown in the analog range display as a dot. Distances are always shown without decimal places.
5	Estimated time of arrival (Nav destination entered): In addition to the display of the estimated time of arrival, the distance to the destination is shown in the analog range display as a dot.
6	Date: The date is always shown with a leading "0" and with the last two numbers of the year.

17

Low Range Warning

If the range is too low, the driver is given a visual warning.

The analog bar gauge and the bar background change color from orange to yellow. The range appears in numbers, overlaying any other on-board computer displays.

The range can be called up by pressing the on-board computer button again.

Warning if the range is too low

Operation Acknowledgements

Operation acknowledgements are shown for 6 seconds in the display area in the left-hand dial. These are overlaid on top of the numerical range display and/or the on-board computer display as well as the average value of the range scale lettering. Any necessary supplementary texts are shown centrally below the dial; the basic indicator "Time" is then hidden.

Operation acknowledgements

Central Information Display

Main Menu

The display in the main menu consists of the following menu items:

- CD/Multimedia
- Radio
- Telephone
- Navigation
- Contacts
- Vehicle Info
- Settings.

Central Information Display (CID)

In addition to this main menu, an arrangement of toggle switches for the most important menu items in the main menu is located in the immediate vicinity of the controller.

The relevant button can be used to call up the following menu items:

- MENU
- CD
- Radio
- TEL
- NAV
- BACK and OPTION.

Option Menu

The "Options" menu always consists of three permanently active (selectable) menu items and, depending on the submenu, a number of variable additional functions.

The three permanently active (selectable) menu items are:

- Split screen on
- Split screen content
- Screen off.

Note: **Whenever a menu is selected, if the controller is moved to the right in the open "TV" menu, the Options menu for this menu is displayed.**

Status Bar

The most important information on the various functions, for example the reception level of the telephone, the time, or the selected radio station as of ignition on, are displayed permanently in the status bar.

Index	Explanation
1	Menu item
2	Time
3	Reception level of the telephone
4	Audio selection

CD/Multimedia Menu

This menu item groups the higher-level drives such as CD/DVD, the created music collections, the interface connections IPOD/USB, AUX and Bluetooth as well as the Tone functions.

The main menu is displayed as of terminal 15 ON.

To call up the menu:

- Press the controller and then push it to the left

- Turn the controller until the desired function is highlighted, then press to activate

Note: Direct selection of the first menu level is also possible by pressing the CD button twice.

The first menu level contains the following submenus:

- CD/DVD

- Music collection

- External devices

- Tone

Further entries or information are linked to each menu item.

CD/Multimedia menu

Radio Menu

The "Radio" menu is one of the most frequently used functions. Certain menu items are specific to the vehicle equipment and are not available to the customer before they have been enabled.

The main menu is displayed as of terminal 15 ON.

To call up the menu:

- Press the controller and then push it to the left

- Turn the controller until the desired function is highlighted, then press to activate.

Note: Direct selection of the first menu level is also possible by pressing the RADIO button twice.

The first menu level contains the following submenus:

- FM

- AM

- Stored radio stations

- Tone.

Further entries or information are linked to each menu item.

Radio menu

Telephone Menu

In the Telephone menu, the phonebook entries can be displayed and sorted according to various criteria. This menu is also used for showing missed calls.

In addition, the interface for Bluetooth connectivity is integrated in this menu.

Note: Certain services are not available to the customer before they have been enabled.

The main menu is displayed as of terminal 15 ON.

To call up the menu:

- Press the controller and then push it to the left

- Turn the controller until the desired function is highlighted, then press to activate.

Note: Direct selection of the first menu level is also possible by pressing the TEL button twice.

The first menu level contains the following submenus:

- Active calls

- Telephone book

- Repeat dialling

- Dial number

- Bluetooth.

Further entries or information are linked to each menu item.

Telephone menu

Navigation Menu

The Navigation menu contains all the functions necessary for operating the navigation system.

The main menu is displayed as of terminal 15 ON.

To call up the menu:

- Press the controller and then push it to the left

- Turn the controller until the desired function is highlighted, then press to activate.

Note: Direct selection of the first menu level is also possible by pressing the NAV button twice.

The first menu level contains the following submenus:

- Destination input

- Address book

- Last destinations

- Points of interest

- Map

- Traffic information

- Course of route.

Further entries or information are linked to each menu item.

Navigation menu

Contacts Menu

The "Contacts" menu is another function in which new addresses of persons or companies can be stored in the vehicle.

Note: Certain services are not available to the customer before they have been enabled.

The main menu is displayed as of terminal 15 ON.

To call up the menu:

- Press the controller and then push it to the left
- Turn the controller until the desired function is highlighted, then press to activate.

The first menu level contains the following submenus:

- New contacts
- My contacts.

Further entries or information are linked to each menu item.

Contacts menu

Vehicle Info Menu

BMW ASSIST Menu

The "Vehicle Info" menu contains all the information regarding the condition, service intervals, the on-board computer and the journey computer of the vehicle.

In addition, this menu contains for the first time a Quick Guide and the electronic Owner's Handbook for the vehicle.

Note: Certain services are not available to the customer before they have been enabled.

The main menu is displayed as of terminal 15 ON.

To call up the menu:

- Press the controller and then push it to the left
- Turn the controller until the desired function is highlighted, then press to activate.

The first menu level contains the following submenus:

- Quick Guide
- Picture search
- Owner's Handbook
- On-board computer
- Journey computer
- Vehicle status.

Further entries or information are linked to each menu item.

Vehicle Info menu

Settings Menu

The individual user settings can be defined in the Settings menu.

Note: Certain services are not available to the customer before they have been enabled.

The main menu is displayed as of terminal 15 ON.

To call up the menu:

- Press the controller and then push it to the left

- Turn the controller until the desired function is highlighted, then press to activate.

The first menu level contains the following submenus:

- Head-Up Display

- Central screen

- Time/date

- Language/units

- Tone

- Limit

- Air conditioner

- Light

- Door locking

- Luggage compartment lid.

Further entries or information are linked to each menu item.

Settings menu

System Components

Instrument Cluster

The instrument cluster is clipped into place in the dashboard with two clips. A shroud prevents reflections in the acutely angled windscreen.

The instrument cluster comprises the following components:

- Four dials

- Indicator and warning lamps

- TFT color display

- Acoustic output takes place via the head unit

- Button for resetting the trip distance recorder and selecting Condition Based Service in CBS menu.
  Press the button for > 4 seconds to select the Workshop menu. Operation is then by means of the reset button of the trip distance recorder.

- Connected components which serve to activate the displays and indicators in the instrument cluster (see system overview/system circuit diagram).

The following components are described in detail:

- Display areas

- Indicator and warning lamps

- TFT display.

Display Areas
The instrument cluster features display areas for:

- Speedometer

- Rev counter

- Economy control (fuel consumption indicator)

- Fuel gauge

- Oil-temperature indicator

- Indicator and warning lamps

- Display

- Programme and gear indicator in the display.

Rev Counter

On theBMW7 Series F01/F02, engine speed is displayed using the following signal chain:

- The DME control unit sends the engine speed across the PT-CAN to the instrument cluster.

- Using a characteristic curve, step pulses for actuating the stepper motor are assigned to the effective engine speed.

Economy Control (fuel consumption indicator)

The fuel consumption indicator (economy control) is an analog indicator in the instrument cluster.

Fuel Gauge

The fuel level is indicated in the small dial on the left.

A pictogram of a fuel pump lights up in the display of the instrument cluster when the level drops below a factory-coded threshold (standard = 8 l gasoline).

A warning tone additionally sounds on reaching the reserve threshold.

Outside Temperature Indicator

The temperature sensor measures the outside temperature and displays it in the instrument cluster.

In ignition key position "0", the instrument cluster applies terminal 30g current to the temperature sensor every 20 minutes.

The instrument cluster makes the current outside temperature available in the form of a data telegram via the PT-CAN.

Indicator and Warning Lamps

The indicator and warning lamps are activated by the processor in the instrument cluster.

All important and legally stipulated indicator and warning lamps are activated at terminal 15 ON during the pre-drive check.

The indicator and warning lamps can be illuminated in different colors or combinations.

Note: The indicator lamp for the rear fog light is not active.

Indicator and warning lamps

TFT Display (thin-film transistor)

The TFT display is divided into the following 7 display areas:

- Symbols, e.g. CBS messages
- On-board computer
- Messages, e.g. traffic information
- Navigation display
  Service Interval Display (CBS)
- Entertainment list, e.g. radio
- Gear program indicator
- Symbols, e.g. outside temperature.

TFT display

Manipulation Dot

If a dot appears in the middle under the trip distance recorder and odometer, different data are stored in the TFT display and in the CAS 4.

The manipulation dot is shown when, for example, a comparison of the stored vehicle identification numbers indicates that they do not match.

Note: Different data may be caused, for example, by replacing one of these two control units.

Acoustic Generators

Audible warnings are given in support of check control messages. All of the acoustic outputs requested in the instrument cluster are generated in the Car Information Computer, CIC. The sound patterns of the various acoustic outputs are also stored in the CIC.

An acoustic generator is built into the instrument cluster fro the turn indicator sound.

The footwell module is responsible for control of the direction indicator function via the K-CAN2.

The vehicles additionally feature an ignition key warning and a seat belt warning.

An uninterrupted warning tone sounds when the driver's door is opened with terminal 15 OFF and the identification transmitter in place.

The audible signal is switched off by closing the door or after 30 minutes.

The seat belt warning is activated at terminal 15 ON if the seat belt buckle contact is not closed.

The audible warning is intermittent and is no longer than 6 seconds. The indicator and warning lamp remains on.

On-board Computer

The on-board computer available for the BMW 7 Series F01/F02 contains a journey computer which includes the following functions:

- Start of journey
- Duration of journey
- Distance covered
- Average fuel consumption 2
- Average speed 2.

Showing Indicators

The on-board computer displays are shown and scrolled in the instrument cluster via the on-board computer button on the steering column lever for the direction indicator lights.

The individual functions appear in the display of the instrument cluster directly underneath the speedometer.

Steering column stalk

Once terminal R is switched on, the computer will display the on-board computer function that was displayed last.

All other functions can be selected by pressing the on-board computer button on the steering column lever.

The sequence of the displayed on-board computer functions is always the same.

The menu guidance is described in detail in the section entitled "Functions".

Service Information

Instrument Cluster Test Functions

The test functions are shown in the TFT display of the instrument cluster.

To Start Function Test
- Terminal R ON or terminal 15 ON.

- Press and hold the reset button in the instrument cluster for 10 seconds (set/reset).

or

- by holding down the setting button in the instrument cluster and simultaneously switching on terminal R.

Display of Test Functions
The test functions appear in the center of the TFT display, between the two dials.

Only tests one through four are unlocked. All other test functions are unlocked by entering the sum of the digits in the vehicle identification number while in test function 4.

To End Test Function
- Ignition key at terminal R or terminal 15 ON.

- Press and hold the reset button for longer than 10 seconds.

The main menu appears in the instrument cluster

- Press the reset button repeatedly until "Test End" is highlighted and then hold down the reset button until the words "Test End?" appear or

- call up test function 19 (RESET).

Note: To protect against unauthorized access, all test functions (with the exception of test 1 and test 2), are locked again after a RESET and "sleep cycle".

Overview of Test Functions

Only the main test functions are listed in the following table.

In addition to the majority of test functions, there are further equivalent functions for which a similar display appears in the instrument cluster.

All the described test functions can also be performed via the BMW diagnostics system.

Index	Explanation
1	Identification
2	System test
3	Test End
4	Unlock test functions
5	Current consumption
6	Range consumption
7	Fuel gauge values
8	Coolant temperature, outside temperature
9	On-board computer average values
10	Speedometer / revolution counter
11	Display of operating voltage
12	Trigger acoustic signals
13	Read fault codes
14	Dim LCD
15	Dim / PWM signal
16	Condition Based Service
17	Check Control
18	Correction factor for consumption values
19	Software reset / RAM reload

Component Replacement and Trial Replacement

There are three possible combinations for replacing the instrument clusters and
Car Access System 4, CAS 4.

- Instrument cluster defective, CAS 4 OK

- CAS 4 defective, instrument cluster OK

- CAS 4 and instrument cluster must be replaced.

Simultaneous replacement of CAS 4 and the instrument cluster should be avoided.
The odometer reading will be lost as a result.

In principle, it is also possible to carry out a trial replacement of the instrument
cluster and CAS 4.

Central Information Display (CID)

Service Mode

The controller can be used to activate the Service mode functions.

The Service mode is a special facility which provides information about the status of the
display and user control system.

**Note: This function was created to aid in diagnosis and is not intended for the
customer.**

The Service mode can be used, for example, to read out hardware/software versions for
the Central Information Display or control units in the CIC system network.

As an addition to the comprehensive facilities of the diagnosis system, the Service mode
serves as a simple means of quickly accessing diagnostic data without a BMW diagnosis
system.

Activating the Service Mode

In the main menu, push the controller forwards and hold there for longer than 10 seconds.

Tactile feedback will then be generated.

Then proceed as follows:

- Turn the controller 3 stops clockwise
- Turn controller 3 stops anticlockwise
- Turn controller 1 stops clockwise
- Turn controller 1 stops anticlockwise
- Turn controller 1 stops clockwise
- Press the controller; the Service mode is added as the last menu item in the "Settings" menu.

The first menu level contains the following submenus:

- Navigation Service
- Telephone
- Gracenote.

Service mode

Note: Push the controller in any direction to return to the main menu.